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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



FEBRUARY 10, 1934

Dressed Up For An Old Date

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A

SCIENCE SERVICE PUBLICATION

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## SCIENCE SERVICE

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## DO YOU KNOW?

The weight of the brain decreases a little in old age.

Labradorite is a gray mineral which flashes in rainbow colors when struck by sunlight.

It is said that geese stay mated for life, and they usually are seen in even-numbered groups.

Government plant breeders have developed a new snap bean that will produce a good crop despite the mosaic disease.

Three million webs of the browntail moth, that damages apple and shade trees, were cut by CWA workers in New Hampshire in three weeks.

Some of the oysters of 19 million or more years ago were so huge that one oyster would have fed a family—had there been any men to eat them in those days.

In ancient Egypt the doors turned, not on hinges, but on pivots.

A British scientist says that about one per cent. of school children are stutterers.

The death rate from tuberculosis among the Indians is seven or eight times that of the general population.

Grizzly bears in the United States proper have decreased 25 per cent. in the past two years, a decline from about 870 animals to about 664.

"Poison gas" was known to South American Indians, who burned the Spanish pepper plant for this purpose when besieging walled villages.

The queer "four-eyed" fish of Central America has its eyes divided in two, the upper part being for sight above water, and the lower for underwater sight.

## WITH THE SCIENCES THIS WEEK

## ARCHAEOLOGY

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## MILITARY SCIENCE

Will big cities be wiped out by gas attack in the next war? p. 84. *What Would Be the Character of a New War?—Sir Norman Angell and others—Smith and Haas, 1933, \$2.50.*

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## SEISMOLOGY

What famous earthquakes have centered in the Walker Lake country of Nevada? p. 89.

## STANDARDS

To what commercial standards projects will the U. S. Bureau of Standards give priority? p. 95.

## ZOOLOGY

Do whales have eyelashes like other mammals? p. 88.

How will the National Zoological Park's reptile house make foreign visitors feel at home? p. 89.

Where do bongos live? p. 84.

*These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, prepaid in the United States.*

## PHYSICS

# Artificial Radioactivity Produced For First Time

**Prof. F. Joliot and Mme. Irene Curie-Joliot Start Boron Disintegration That Continues After Bombardment Ends**

**A**RTHIFICIAL radioactivity has been produced for the first time by Prof. F. Joliot and Mme. Irene Curie-Joliot, the famous Paris physicists who are husband and wife. Mme. Curie Joliot is daughter of the discoverers of radium.

Never before has radioactivity been created by an external cause.

This achievement has stirred interest at the famous Cavendish Laboratory, Cambridge, where experiments attempting confirmation are in progress. There is hope that through artificial radioactivity medically useful radiation will be produced.

The artificial radioactivity produced by the Joliot consists of obtaining positrons or positive electrons from bombardment of boron with alpha particles. The important fact is that the activity or disintegration produced continues for many minutes after the bombardment is stopped. Boron decays exponentially to thirty per cent. in fifteen minutes. Similarly, artificial radioactivity proceeds in aluminum and magnesium. The decay period in aluminum is four minutes.

Lord Rutherford, the famous Cambridge physicist, declared:

"It is remarkable that the life of the unstable atom produced is as long as it is. We do not know whether the atoms so far made artificially radioactive are typical or whether other unstable atoms which may be produced will have a longer or shorter life."

"The discovery of the Joliot shows how little we really know about radioactivity."

The mechanism of the artificial radioactivity of boron is interpreted to mean that a boron atom and the helium nucleus or alpha particle unite to form a neutron and an unstable nitrogen atom of weight thirteen which in turn changes to a carbon atom of weight thirteen with the release of a positron. The positron is the new particle discovered in 1932 at Pasadena, Calif.

The Joliot is a famous research team following in the scientific path

blazed by Mme. Curie-Joliot's famous parents. M. and Mme. Joliot made experiments that were an important step toward the discovery of the neutron at Cambridge, England, in 1932.

While transmutations and disintegrations of matter have been accomplished in many ways before, the progressive and continuing disintegrations of atoms have not heretofore been accomplished or instigated artificially. Natural radioactivity has been proved, since its discovery before the turn of the century, to be a property of many atoms.

Uranium and radium are typical elements that are naturally radioactive. Some of the unstable atoms naturally radioactive have an extremely long life. The activity of radium only falls to half its value in 1600 years. Other spontaneous changes require time measured in seconds, thus being similar to the artificial radioactivity discovered.

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## GENERAL SCIENCE

## Czar's Books, Rare Costumes Come to Philadelphia Museum

**R**ARE archaeological books from the private library of the late Russian Czar, and Russian peasant costumes centuries old, have been received by the University of Pennsylvania Museum.

About 125 of the Czar's books, mostly archaeological works, have come to the Museum by an arrangement made with leading Soviet museums for exchange of material and scientific data.

Outstandingly magnificent is "The Byzantine Enamels of A. V. Zvenigorodsky," which was printed in a limited edition in 1896, at a cost of about a thousand dollars a volume. Special paper was used, and artists and technicians worked for years on processes that would best reproduce the delicate shades and tints of the enamels. The binding is of white leather ornamented in



**COPY NUMBER ONE**

Eugene A. Golomshtok, representative in the Soviet of the University of Pennsylvania, is holding the first copy of "The Byzantine Enamels of A. V. Zvenigorodsky," acquired by the American institution. Unusual progress has been made by Soviet archaeologists, Mr. Golomshtok states, and cites the following discoveries: statuettes found at sites used by men of the Old Stone Age; the only complete set of bones of both feet of Neanderthal man; remains of dwellings of Aurignacian man; and traces of a "blonde race" in Siberia.

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Byzantine style, and cloth hand-woven from gold threads. Of the 200 copies printed, the first was presented to the Czar and inscribed, "The Copy of His Majesty the Emperor."

The Russian books have come to the Museum through the courtesy of the State Hermitage Museum in Leningrad. The ethnological material, including the costumes, came from the State Central Anthropological Museum in Moscow.

The peasant costumes and jewelry and embroidered silks and linens are characteristic of those commonly in use in Russia several centuries ago. They are now virtually unobtainable. The front cover shows two costumes being "modeled" by University of Pennsylvania co-eds.

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## MEDICINE

# Study of Pituitary May Yield Thyroid Disease Treatment

**A** NEW treatment for Graves' disease or exophthalmic goiter may result from studies of the pituitary gland reported by Drs. J. B. Collip and Evelyn M. Anderson of McGill University, Montreal, to *The Lancet*.

Although Graves' disease is a malady resulting from overactivity of the thyroid gland the McGill investigators have previously found that it may be produced in animals, at least, by a hormone from another gland, the pituitary. Injections of this pituitary gland hormone produce typical symptoms of Graves' disease, including the familiar protruding eyes, enlarged thyroid gland and elevated metabolic rate. This latter indicates that the energy transformations always going on in the body are proceeding at a faster rate than normal.

## Metabolic Rate Drops

This metabolic rate drops after continued injections of the thyroid-stimulating pituitary hormone, eventually becoming much lower than normal, Drs. Collip and Anderson have now found. The animals apparently develop resistance to the hormone. When blood from these resistant animals was injected into normal animals and into animals having no pituitary glands, the thyroid-stimulating hormone had no effect.

Animals that had become resistant to the thyroid-stimulating hormone, however, responded to a dose of dried thyroid gland with the rise in metabolic rate characteristic of an increase of thyroid substance in the body. This indicates that the resistant substance in the blood acts between the thyroid gland and the pituitary gland, checking the effect of the latter on the former, and not between the thyroid gland and the other body tissues.

## Far From Application

Present treatment of Graves' disease is directed toward checking the effect of the thyroid gland on the tissues by removal of part or all of the gland. The indications are that future treatment may be directed toward checking the thyroid-stimulating hormone of the pituitary with serum from resistant animals. However, much more investiga-

tion will be needed before anything like practical application in humans can be attempted.

"Further investigations along these lines are being made," Dr. Collip stated in his scientific report.

He and his associates also have obtained evidence that a similar substance capable of checking the effects of other pituitary hormones may develop and they are investigating this problem also.

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## MILITARY SCIENCE

# Air Raid Menace Debunked By Soldiers and Scientists

**W**AR CLOUDS pile up and darken on the horizons of Europe and the Far East; yet even as their first far-off menacing lightnings flash, there arise counter-prophecs to deny the worst of the impending woes we have been taught to expect from a "next war."

Gas attacks upon cities by swooping airplanes are not going to wipe out whole populations. So leading students of military science are now insisting.

Maj.-Gen. Harry L. Gilchrist, who has just retired as head of the chemical warfare arm of the U. S. Army, has long been a disbeliever in the military practicability of airplane-gas attacks on cities; and recently Capt. B. H. Liddell Hart, well-known British military historian and critic, has entered a denial in similar vein.

Comes now a Swiss military engineer, Capt. W. Volkart, to add his voice of doubt to theirs. Admitting the possibility of severe material damage and deep effects on popular morale by airplane bombing raids on limited objectives, such as arsenals, factories and railway centers, he registers thorough skepticism as to the likelihood of success of any attempt to wipe out a whole city by a mass attack with gas bombs.

To make the case concrete he chooses the city of Zürich, with a population of about a quarter of a million, occupying an area of some 17 square miles, of which about six square miles is really densely inhabited. To depopulate a given area and keep it unoccupiable,

Capt. Volkart says, requires a concentration of two grams of mustard gas per square meter (roughly one ounce to 15 square yards). With a little pencil-and-paper work, he reaches the figure of 150 tons of mustard gas as the minimum necessary to devastate the densely populated part of Zürich.

The typical heavy night bombing plane carries a ton of combat load. Thus 150 planes could turn the trick, flying under ideal conditions, without opposition, and every bomb scoring a perfect hit. But, Capt. Volkart objects, under wartime conditions such hundred per cent. success could not be expected. Allowing for accidents, defensive fighting by combat planes and anti-aircraft guns, missing of targets, reduction of gas efficiency by ground wind, and other factors, he estimates that the number of planes needed for such a raid would be nearer 500 than 150—and no European power, he says, has 500 heavy bombers at present.

Weather alone, Capt. Volkart continues, would constitute a considerable defense measure. Fog would make a raid impossible, low clouds reduce its efficiency, rain or snow absorb the gas, freezing weather slow down its evaporation and make its elimination by the local fire department easy.

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## ZOOLOGY

# Rare African Antelopes Mounted in Field Museum

**B**ONGOS, the only large antelopes that shun the open grassy plains and live in the heavy forests, especially the dense bamboo thickets, shy, unapproachable, rarely seen even by the most experienced hunters and explorers, are to be familiar sights henceforth to anybody with sufficient curiosity to visit the case in which a notable new group is mounted at the Field Museum of Natural History in Chicago.

This new group, believed to be the only museum group of these animals in the world, was opened to public view a few days ago. The five specimens are the gift of Capt. Harold A. White of New York and the late Maj. John Coats, of Ayrshire, Scotland, who jointly financed and led to Africa the expedition which collected them. They were also successful in making the first motion pictures ever taken of living bongos.

Full-grown bongos range from 400 to 600 pounds in weight. The bongo is

somewhat related to the eland, and also to the smaller bushbucks. As in the eland, horns are present in both sexes. The horns are black with white tips, and spirally curved. The bongo has unusually large fringed ears, black feet, and a long ox-like tail. The brilliance of its rust-red color does not detract from the protection afforded, because the broken pattern made by the white stripes has a concealing effect against a background of vines, branches, and alternating light and shade, as does the striped pattern of a tiger or a zebra. For years the museum authorities have hoped for specimens of the animal, which was one of the very few important large African mammals lacking in the institution's collections.

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## CHEMISTRY

## Zinc-Acid Reaction Yields Heavy Hydrogen

**A** NEW method of concentrating the double-weight or heavy hydrogen, the essential constituent of heavy-water from which remarkable developments are expected, is reported in the scientific periodical, *Nature*, by Drs. A. and L. Farkas, expatriate German chemists now working in the Colloid Laboratory of the University of Cambridge, England.

The new method is chemical and consists in dissolving metals such as zinc in a dilute solution of sulfuric acid. Under proper conditions the lighter or ordinary hydrogen is displaced faster than the double weight variety, in the ratio of four to one, so that the liquid becomes richer in the heavier or double weight variety of hydrogen.

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## ASTRONOMY

## Only American Observer Of Eclipse Tells Plans

**Dr. Cohn, Now Guest of Japanese Government, Gives Exclusive Report of Studies He Expects to Make**

By **DR. WILLI M. COHN**, Leader of American Eclipse Expedition to Losap Island

**T**HE Japanese government invited me to travel to Losap Island in the Carolines in company with the Japanese astronomers who will view and study the year's only total solar eclipse on Feb. 14. The Japanese Navy ship *Kasuo Maru* carried us to Losap, a small coral island. No American observatory is sending an expedition but I shall be aided in my researches by cameras from the Lick and Harvard Observatories which supplement my own equipment.

I am carrying with me:

Two cameras of about 60-inch focus, each equipped with a fine quartz, double-image prism, for photographing the inner and the outer corona.

Polariscope for measuring the polarization of the sky light close to the sun.

Two cameras for direct photography of the corona through color filters, one of them equipped with four plates, and the other with a plate for infrared photography, allowing a comparison of the color of the corona and that of the sun.

Camera with an objective prism to be used for photographing the continuous spectra of the photosphere, or the layer close to the surface of the sun,

and that of the sun itself. The comparison of these spectra may show whether there are any differences in the two continuous spectra as shown by the presence of more than one maximum in the spectral energy curves.

Hilger grating spectrograph to measure the change in the spectrum of the skylight during the entire eclipse.

Full equipment for printing standard squares and comparison spectra on all plates which will allow a reduction of the plates as necessary for photometric work.

All instruments are mounted on a polar axis. This is driven by a clock and it will follow the apparent motion of the sun during the period of totality.

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## ARCHAEOLOGY

## Lion's Tooth Called First Musical Instrument

**W**HAT is believed to be the oldest musical instrument in the world has been discovered on the slopes of the Pollau mountains in Czechoslovakia. It is a musical pipe made of a lion's tooth. It sounds a signal in the notes of D and G which can still be played perfectly after some 30,000 years.

Prof. Karel Absolon of the Brno University, discoverer of the pipe, claims that the very origin of musical instruments, and painting and sculpture as well, is traced to these mountains. His excavations, continued through a number of years, have brought to light many objects made by the mammoth hunters of Central Europe. The lion-tooth pipe is his latest find.

The artistic work of this Aurignacian culture is shown by such pieces as the head of a wild horse, admirably modeled. The stone horse's head is identified as copied from the little horse, *Equus ferus*, which was thickly covered with hair and roamed in Europe during the Ice Age. The species was re-discovered only in the eighteen eighties, by a



BONGO FAMILY "AT HOME" TO MUSEUM VISITORS

Russian explorer in the Central Asiatic steppe lands. A reindeer head is another art work by the mammoth hunters.

Most striking of the art exhibits is the statue of a mammoth complete. The prehistoric sculptor captured the characteristic form of the shaggy giant, the back drawn upward, its plump and heavy legs, all familiar to science from reconstruction of real mammoth remains.

The ancient hunters made "combination tools," Prof. Absolon's collection shows. One three-fold implement is a blunt stiletto at one end, a notched trowel at the other, while from beneath it is a chisel. A saw with serrated teeth is another tool of this Old Stone Age.

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#### GEOLOGY

### Whetstones Contain Ancient Climate Record

**W**HEN a farmer leans upon his scythe while he whets its blade, he may be unconsciously sharpening his modern tool with a record-in-stone of an ancient climate. For the widely used banded whetstones made from a peculiar type of gritstone quarried in Orange and Perry Counties, Indiana, tell of alternating seasonal abundance and scarcity of rainfall during the early Pennsylvanian geologic age, a quarter of a billion years ago, when "slimy things did crawl with legs" out of the water and onto the land, laying the foundation of the since proud line of land-living vertebrates.

The dark bands in the stone indicate the presence of abundant organic matter, the light bands point to its scarcity or absence. There were good seasons and bad in those remote times, and their traces were left in the sands deposited under water, that have since turned into stone.

This is the story read in the banded stones of Indiana by Dr. David White, associate in geology of the U. S. National Museum.

Similarly layered under-water deposits of other geologic periods have been interpreted as showing series of mild and severe seasons in cyclic succession. Thus far, however, the banded gritstone material examined by Dr. White has been too scanty to justify any definite conclusions regarding seasonal cycles during the Lower Pennsylvanian.

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#### ENGINEERING

## Is One-Rail Train Next Step For Land Transportation?

**T**HE VISION of a train or car rushing along on one rail, kept from falling over by a spinning gyroscope, has been pursued by a number of inventors and engineers since the turn of the century.

Now with railroads going modern, streamlining their locomotives, lightening their rolling stock, using single car trains diesel-electric propelled, it may be that serious thought will be turned to the monorail for land transportation. It may be a method of allowing the railroad to follow not too far behind the increasing speed of the passenger and freight carrying airplane.

#### Bicycle Shows Safety

The problem of using gyroscopic stabilization has been investigated by a British engineer, Dr. J. F. S. Ross, and his inquiry is reported in a book: "The Gyroscopic Stabilization of Land Vehicles." (Edward Arnold & Co. in London; Longmans, Green & Co. in New York.)

"To the sceptic who distrusts the practical safety of the monorail I would commend the object-lesson of the bicycle," Dr. Ross says. "Who now, apart from a small minority of invalids and eccentrics, regards the tricycle as a better means of locomotion than the bicycle, or casts aspersions on the latter as unsafe in itself and liable suddenly to flop over? So it may well be with the monorail; if once the arduous (and expensive) stage of experiment is successfully surmounted, we may look back upon double-rail traction as antiquated and clumsy, and marvel that people ever thought the monorail unnatural or unsafe."

#### Seems Contrary to Nature

Even the spinning top, which is a form of gyroscope with which all are familiar, gives a vague feeling of distrust, Dr. Ross observes.

To the ordinary, non-expert person, the behavior of a gyroscope is apt to seem contrary to the laws of nature. He cannot understand why, being top-heavy, it does not fall over, nor why, when pushed in one direction, it moves in a quite different direction. He can-

not quite believe that its behavior is perfectly normal and explicable, and he has a lurking suspicion that, if he were to rely on the gyroscope as a monorail mechanism, sooner or later it would let him down by suddenly ceasing its eccentricities and behaving in what he would consider a more normal way.

Though there are no good grounds for such views, in Dr. Ross' opinion, it must be admitted that there are considerations which may serve to excuse them. In the first place, no one has yet produced a large-scale monorail car which gives evidence of that complete reliability in all circumstances which is essential for commercial success; and, in the second place, the explanation of gyroscopic phenomena, and the calculations necessary in connection with gyroscopic apparatus, involve a certain amount of mathematics of a somewhat specialized character.

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#### ENGINEERING—ARCHAEOLOGY

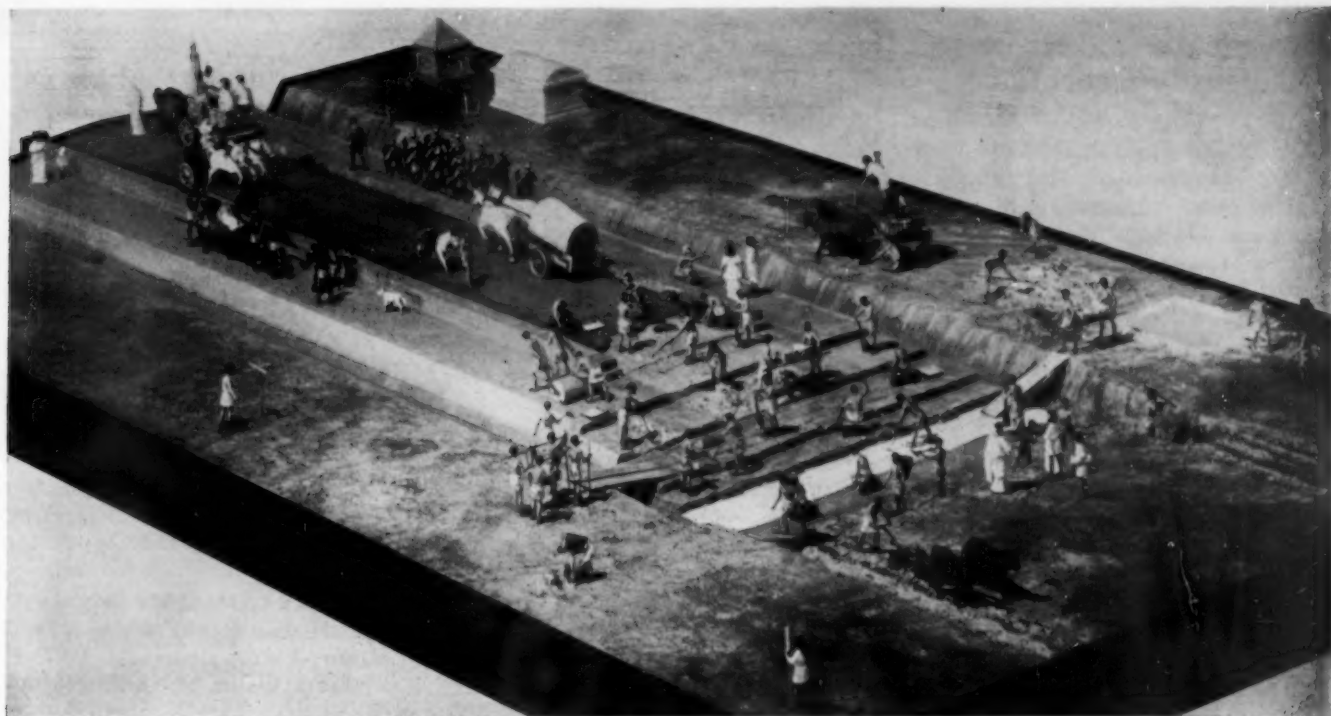
### Model Shows Building Of Famous Appian Way

**F**AMOUS highway construction of a distant day and how the ancient road was used are illustrated with an elaborate model of the Appian Way which has been built by the U. S. Bureau of Public Roads for the National Museum. More than one hundred carefully designed figures of men and animals, with their tools and vehicles, are working on the highway or passing over the newly finished surface.

The chief difference between the ancient Roman road and the modern highway is that the present-day engineer relies upon the soil to bear the load; the pavement should act as a wearing surface and a roof to protect the supporting subgrade soil. The Romans relied solely on massive construction. Using modern ideas, the roadbuilder of today has been able to build more extensive highway systems at a small part of the cost of Roman roads.

This road, which endures after twenty centuries, was 16 feet wide with 2-foot





GLIMPSE AT ANCIENT HIGHWAY CONSTRUCTION

curbs 18 inches high on both sides, beyond which were 8-foot side roads. The Appian Way was of solid stone and concrete masonry 3 to 4½ feet thick, depending upon the soil on which it was laid. It was very straight, with steep grades and the curves widened as on modern roads.

In building the Appian Way, a bed of sand and gravel sometimes covered with a thin coat of lime mortar was used as a foundation for the four layers of masonry. The first masonry layer, from 10 inches to 2 feet thick, was composed of stones that would fit in a man's hand held together with lime mortar or clay. The second layer of smaller stones mixed with lime mortar was 9 inches thick. The third layer was of concrete made of small stones, sand and hot lime mortar 1½ feet thick in the center and a foot thick on the sides to give a crown to the road. The fourth or wearing layer was of polygonal stones about 3 feet in diameter and 6 inches thick laid with close joints. The upper surface of the wearing stones was dressed smooth and the joints fitted so tight as to be scarcely discernible.

These features of construction may be readily distinguished in the photograph. A detailed description of the model is available at the U. S. Bureau of Public Roads, Washington.

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## ORNITHOLOGY

## Eskimo Arrowhead Found In Duck Killed in California

**T**HE HARDINESS of the mallard duck was dramatically demonstrated in a bird shot down over a lake near Bakersfield, Calif., recently. Postmortem examination of the duck resulted in the discovery of a 9½-inch triangular bone arrow head of the type used by the St. Lawrence Island Eskimo firmly imbedded in its breast.

The mallard was shot by a friend of L. C. Barnard of Los Angeles. Its projectile was declared by the Los Angeles Museum to be of undoubted Eskimo origin.

The arrowhead was triangular in cross section, was unbarbed and was fashioned of mammal bone, probably from the leg bone of a caribou from the mainland. In type, the missile point checked closely with the bone and ivory arrowheads used by the natives of St. Lawrence Island in the Bering Strait off Alaska. The sinew wrappings on the head had been softened by the blood, and the wooden shaft had long since dropped free.

When discovered, the butt end of

the blade projected some two and a half inches from the breast of the duck. Judging from the position in which the arrowhead lay, the Eskimo hunter had released his shaft from the rear of the bird just as it cleared the water.

This is not the first instance of such projectile points being discovered in birds flying south from the Arctic. A few years ago a farmer in Nebraska reported the discovery of an ivory arrow point, likewise of Eskimo origin, imbedded in the flesh of a goose he had shot. Another report was made of the discovery of a barbed bone arrow head of Eskimo type found in the open in New Mexico. Perhaps some of the scattered instances of discoveries of similar artifacts of alien manufacture found thousands of miles from their original source may well be attributed to some such accident.

It does not take long for a protecting sheath of gristle-like material to form around alien objects in a bird's body, and once healed, the creature might live indefinitely.

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## ZOOLOGY

**Whale's Eye Added To Museum Collection**

**T**HE SECOND whale to strand itself within a few weeks off the New England coast went ashore at Monomoy Point, near Chatham. The whale proved to be a finback, and hundreds came to see the huge mammal.

Curator William H. Tripp of the New Bedford Whaling Museum and Wilbur G. Sherman, an expert in whaling affairs, made the trip to inspect and study the whale and see if part of it could be saved for the Whaling Museum. With the aid of cutting spades, hatchets and knives, they succeeded in getting several valuable specimens. Among them was one eye of the whale.

The eye was encased in a big piece of blubber-like "junk," measuring about 11 by 9 inches. The eye itself is about the size of a medium sized grapefruit. Looking at the eye from the exterior, the orifice of the eye is about three inches long and an inch and a half wide. The skin about the orifice of the eye was quite smooth and oddly enough free from eyelashes such as nearly all mammals possess.

When the junk is separated from the eyeball, the eyeball will be preserved in alcohol and placed in the museum where scientists may study it.

*Science News Letter, February 10, 1934*

## CHEMISTRY

**Dye in Ink Test No Proof Of Age of Writing**

**C**ONTRARY to statements made by experts on disputed documents that the blue dye in writing done with an ordinary blue-black ink will be oxidized away in fifteen years, C. E. Waters of the U. S. Bureau of Standards has found undecomposed dye in 78 out of 148 samples of writing older than 15 years.

The oldest sample in which dye was found dated from 1881, while writing as recent as 1918 contained none. It is therefore held impossible to conclude from the presence or absence of dye that one sample of writing is more recent than another.

The composition of inks varies a great deal according to the ideas of the manufacturer, but in general a blue-black ink contains the following substances: ferrous sulphate, tannic acid and gallic acid from nutgalls, a free mineral acid, an antiseptic, and a blue dye. The per-

manent black color of the writing is produced by the oxidation of the iron from the almost colorless ferrous compound to a black ferric compound, and the purpose of the dye is to provide a temporary color.

Ultimately all the organic matter in the ink will be oxidized by the oxygen of the air and it has been believed that fifteen years is amply sufficient for the complete destruction of the dye. In a recent legal controversy involving the age of three letters it was found that there was still dye present, and two hand-writing experts immediately deposed that the letters could not be more than fifteen years old.

The test for dye is a very simple one. A drop of distilled water is placed on the writing and a piece of filter paper pressed against it. At a pinch, ordinary water and the white margin of a newspaper can be used. A blue coloring on the paper indicates the presence of dye.

*Science News Letter, February 10, 1934*

## ELECTRONICS

**"Move Over" Truck Signal Wins Favor In France**

**T**RUCK drivers on French highways will no longer have any excuse for not "moving over" to let other cars pass, if a new signaling device becomes standard equipment. A report to the National Safety Council, Chicago, indicates that the new device is likely to be required in France this year.

To signal the desire to pass, a motorist driving back of a truck flashes his headlights. The light rays strike the truck's signaling device, which is a sturdy and inexpensive "electric eye." The "eye," a photo-electric cell, sets off a warning bell which rings at the front of the truck.

*Science News Letter, February 10, 1934*

## PATHOLOGY

**Snails Get Fever When They Are Sick**

**E**VEN cold-blooded animals like snails get fever when they are sick as a result of parasitic infection, it appears from studies of C. T. Hurst and C. R. Walker of Western State College of Colorado. At the meeting of the Colorado-Wyoming Academy of Science they reported that they observed a definite rise in temperature in snails infected with the trematode worm.

*Science News Letter, February 10, 1934*

**IN SCIENCE**

## PSYCHIATRY

**Fear of Spending Is New Mental Ill**

**A** NEW mental disease of those who have money and refuse to spend it—against whom the NRA "Buy Now" campaign is being directed—is described by Dr. Alvan L. Barach, psychiatrist of New York City in a report to the National Committee for Mental Hygiene.

This new mental ailment, born of the depression and much more prevalent than those with small incomes can realize, is akin to the attitude of ascetic zealots of times gone by who renounced the evils of the flesh and all worldly goods under the fear of punishment and the hope of heaven; but these 1934 self-sacrificers do not have the religious aspirations and fervor, an analysis of such persons has shown Dr. Barach.

Urged by a sense of guilt for some unknown or unanalyzed fault, these men and women attempt to pacify their consciences by "tuning in on suffering" they know others to be feeling, by imposing on themselves deprivations which are altogether unnecessary. The resulting feeling of satisfaction is so great as to drown out all feelings of sympathy and responsibility for those made jobless by the action.

Men do without their cars, women dismiss their maids, both do without clothing, lights, phone calls, and even food. Those whose incomes are reduced 25 per cent. reduce their expenditures 50 per cent. Dr. Barach asked one young woman what she had done with the \$800 she had saved by not making a purchase of clothing she would have made in ordinary times. Had she given it to the poor?

"No, no, I just put it in the bank," was the reply.

She couldn't understand why a neighbor had bought a new car when so many people in "times like these" do not have enough to eat. The fact that the man who bought the car had also given a twelfth of his income to the unemployed did not impress her.

*Science News Letter, February 10, 1934*



# SCIENCE FIELDS

## SEISMOLOGY

## California Quake Really in Nevada

CALIFORNIA'S newest earthquake, which occurred on Tuesday night, Jan. 30, did not really belong to California at all but to the neighboring state of Nevada.

Its epicenter, as calculated by seismologists of the U. S. Coast and Geodetic Survey on the basis of data collected by Science Service, is given a location near the Walker Lake region, about 25 miles southwest of the town of Mina, and some fifty or sixty miles southwest of the epicenter of the great shock of Dec. 21, 1932, one of the most violent recorded in the United States. Another earthquake occurred in the same region on June 25, 1933, so that the Walker Lake country must be accounted a "live" seismic area.

As worked out by the Coast and Geodetic Survey, the epicenter was located in latitude 38.2 degrees north, longitude 118.6 degrees west; time of origin was 3:16.3 a. m., eastern standard time.

*Science News Letter, February 10, 1934*

## ZOOLOGY\*

## Artists Under C.W.A. Paint Snakes' Homes

VISITORS to the reptile house in the National Zoological Park, Washington, are finding unexpected specimens in the glass-fronted dens ordinarily inhabited by snakes or lizards. Real live artists, in paint-stained smocks, are busily painting on the back and side walls realistic scenic backgrounds proper to the parts of the world from which the reptiles have come. Thus, the dens inhabited by Gila monsters and rattlesnakes from the Southwest are being decorated with backgrounds of giant cacti and yuccas, while tropical snakes will henceforth live surrounded by painted banana leaves or the tree-trunks of a rubber plantation.

This is not for the benefit of the reptiles, Dr. William M. Mann, director of the Park, explained. It is for the

visitors. "I want everybody who comes into the reptile house, no matter what part of the world he hails from, to see at least one picture that will make him homesick," he added.

Artists have also been engaged to do some large mural paintings on the walls of the bird house. The central idea of this decoration will be a series of large pictorial maps, each with several species of beautiful unusual birds "spotted in" on its own proper habitat.

The C.W.A. is also enabling the National Zoological Park to make many desired changes and improvements, providing work for some 200 artisans and laborers. An artificial "alp" is being constructed over a steel framework, for the Rocky Mountain sheep, and substantial houses of stones are replacing old wooden shelters for hoofed animals.

*Science News Letter, February 10, 1934*

## PHYSIOLOGY

## Spices Found To Stimulate Digestion

SPICES and condiments in moderate amounts really help digestion by stimulating part of the digestive apparatus to greater activity. Scientific evidence of this has been reported by Drs. E. v. Kokas and G. v. Luchány at the Stefan Tisza Institute of the University, Debrecen, Hungary.

The research of the Hungarian investigators, it is claimed, shows that spices in dilute solutions, as they are found in rather spicy meals, actually increase the activity of the villi. These are microscopic protuberances of the mucous membrane of part of the digestive tract and have an important influence on the speed and completeness of food absorption. Increasing their activity favors the passage of foodstuffs from the digestive tract into the body fluids.

Cloves and garlic in solutions of one to one thousand triple the intensity of movement of the villi, it is claimed. Pepper, red pepper, caraway and cinnamon act in the same way but have less intense effect. Onions have the weakest effect on the villi.

Evidence of the stimulating activity was obtained indirectly by microscopic examination of the activity of the mucous membrane and directly by observing that sugar solutions injected into the digestive tract are absorbed better when mixed with small quantities of these spices.

*Science News Letter, February 10, 1934*

## PHYSICS

## Theory Upholds Birth of Electrons From Radiation

THE IDEA that a bundle of radiation, such as a cosmic or gamma ray quantum, collides with an atomic kernel or nucleus, and gives birth to a positive electron or positron, receives support from calculations made by Drs. W. Heitler and F. Sauter, working at the University of Bristol and the Technische Hochschule at Berlin-Charlottenburg.

There has been considerable discussion as to just what happens when powerful radiation smashes into matter and particles fly out. Some physicists have interpreted these experiments as the conversion of energy into matter, while others suggest a blasting of the atom's center, releasing particles already there.

The widely acclaimed electron theory of Prof. P. A. M. Dirac, the British physicist and Nobel prize winner of 1933, and his formulation of the wave equation so as to explain experimental findings about the hydrogen atom, can be used to explain what happens if a fast electron, passing through matter, emits a quantum of radiation with energy comparable to its own, and the reverse happening, if a quantum of radiation colliding with an atomic nucleus gives birth to a positive electron.

The production of a pair of electrons by cosmic radiation in the presence of an atomic nucleus has been reported as the result of experiments at Cavendish Laboratory, Cambridge, England, by Prof. P. M. S. Blackett and G. Occhialini, although Dr. Carl D. Anderson, of California Institute of Technology, Pasadena, Calif., discoverer of the positive electron, takes the view that the electrons produced by cosmic rays smashing into matter are probably not created out of radiation but are merely fragments of the atom's heart that has been disrupted.

Drs. Heitler and Sauter have calculated from the Dirac equation what is to be expected when radiation turns into electrons and the result agrees well with the experimental results. For the opposite process, similar calculations show that the theory seems to disagree with experiment. But the physicists explain that the Dirac wave equation may not apply to the very small radius of the electron and when the radiation has a wavelength that is smaller than this radius.

*Science News Letter, February 10, 1934*

PHOTOGRAPHY

# Right Side Up

**While "Stunting" For Its Makers, High Speed Camera Discovers Cat's Secret of Turning Over In Fall**

**By DR. FRANK THONE**

**"J**UNIOR, will you stop tormenting that poor cat?"

A whole chapter of "Why Mothers Get Gray" might be written around the irrepressible drive of small boys to experiment with animals, especially with the family cat. Particularly did you delight in picking up poor Pussy by her four feet, holding her upside down, and letting go, to see how she always managed to land right side up. Whether you were impelled merely by a budding scientific curiosity, or had more utilitarian hopes of learning a trick that would be useful in unexpected falls out of trees or off woodshed roofs, that was the favorite experiment.

But you never learned the cat's secret. Pussy took her nine lives to her grave, and her nine-times-nine kittens and grand-kittens followed her in their time, without divulging that very useful trick of the feline trade. No matter how often you did it or how closely you watched, it was always all over in a split second. Pussy's performance, like that of the mystifying magician you gaped at on the stage, was too quick for the human eye to follow.

## Seen by National Academy

No discredit to you or to any small boy for not finding out how the cat turns over. It required the resources of a great engineering laboratory and the cleverness of two ingenious and hard-working young scientists, to make the matter plain. But a short time ago a movie of a cat turning over in mid-air, of a couple of flies "taking off," of a canary launched into flight and a number of other too-quick-to-see movements done by living animals were shown before the meeting of the National Academy of Sciences at Cambridge, and the most learned men in America ceased for a while their discussion of cosmic rays, the expanding universe, and other things of like abstruseness to watch and applaud.

For they recognized that in the ultra-

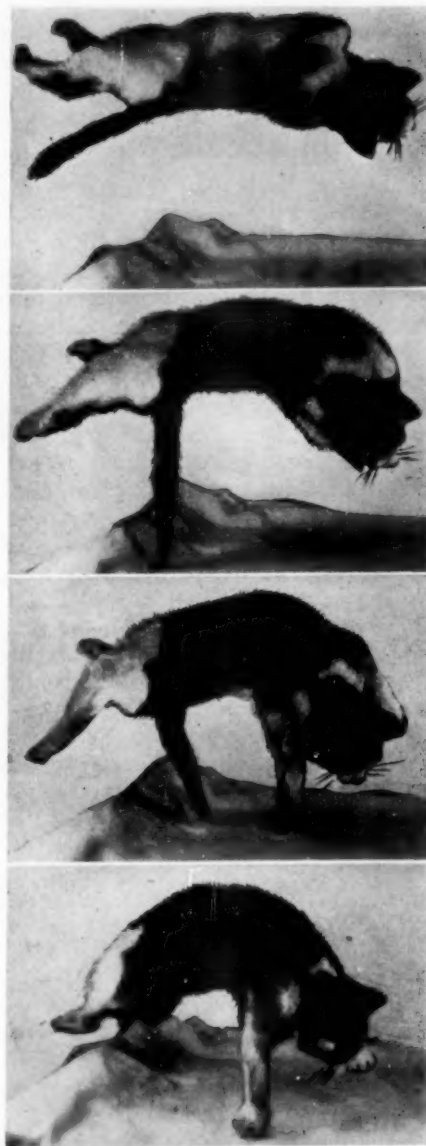
fast camera invented by Dr. Harold E. Edgerton and Kenneth Gernsmaen, of the Massachusetts Institute of Technology, there is available to science not merely a fascinating toy for catching a cat doing a flip-flop but a scientific weapon of extraordinary power for use in solving all sorts of problems involving very rapid motion. Making motion pictures at the rate of hundreds, even thousands, of exposures a second instead of the conventional sixteen, this camera can "freeze" even a bullet in its flight, yielding a clear, sharp, un-fuzzed picture; and its slow-motion effects make those of the ordinary newsreel product seem to gallop by comparison. Every detail of the object in motion can be studied and scientifically analyzed.

## Flashlight Machine

The camera is actually a flashlight machine, taking whole strings of flashlights in a few seconds, instead of a single, much-fussed-over exposure. It has no shutter: the lens is open all the time, and the exposures are made either by electric sparks jumping a gap, or more usually by one or more specially constructed mercury vapor lamps so controlled by a vacuum-tube hookup that they flash and go out, flash and go out, any desired number of times a second, each time burning an image into the motion picture film as it races at high speed behind the ever-watching eye of the lens.

So when Dr. Edgerton reverted to his boyhood, and dropped an inverted kitten in front of the camera while his partner Mr. Gernsmaen closed the switch, that pet of the laboratory at last betrayed every detail of Tabby's technique for turning over and landing on all fours. The drop was only a short one—less than two feet—but in that time the kitten made the turn. First her front feet came around, then her hind ones. Because of the shortness of the fall she barely had time to get those hind legs into position before she hit the table; a foot more of drop would have been to her better liking.

The pictures show the highly effi-



## KITTY'S FAMOUS FLIP

*These four pictures show how a cat rights itself during a two-foot fall when dropped bottom side up.*

cient mechanism a cat is, at this business of getting right side up while hanging onto nothing. She arches her inverted back, thus giving longer leverage for the the swiftly-working muscles. She even uses her tail as a balancing-pole, holding it rigid and swinging it in a direction opposite to that taken by her legs.

One detail of the cat's behavior in a natural fall the two experimenters did



not have a chance to learn. Because they had to hold their kitten upside down for a moment before they let her drop, she had time to turn her head and study the place where she was to fall. It was noticed, however, that she turned her head in the same direction that she later turned her legs, so there was no lost action. Presumably all cats do this, swinging the whole body through a spiral, with the head leading off.

It may be a fundamental pattern in the behavior of all turning animals. You can see a fine example of it if you will watch a whirling dancer on the stage. The order is always the same: first head, then shoulders, then hips. It may be that the Edgerton-Germeshausen camera will some day become part of the equipment of schools of the ballet, to analyze the movements of the hopeful pupils and correct their faults.

### Flies Face the Camera

However, for the present, the employment of the machine is less pretentious, being contented with the analysis of the movements of high-speed lower animals. One of the sections that most interested the members of the National Academy showed in silhouette the gyrations of two flies when they were launched unexpectedly into the air.

The flies were coaxed into position in front of the camera lens by a bit of jam on a piece of cardboard. They were permitted to get settled to their feast, and then the cardboard, attached by a string to the camera motor, was jerked quickly from under their feet when the machine was started.

Each time (for the fool flies came back to the jam time after time, as flies will) one of the insects was tossed into the air at a different angle—once or twice it was completely upside down. This enabled the scientists to see how a fly rights itself in the air. This is done by shortening the stroke of the "up-side" wing and strengthening the stroke of the "down-side" one, much as a rower in a boat corrects his direction by differing the pull on his two oars.

Once, when one of the flies was turned completely over, it flew the wrong way—downwards instead of up, until it touched the table, bounced over, and righted itself for a second launching, this time right side up.

Dr. Edgerton and Mr. Germeshausen got motion pictures of only two flies, for the film was made when autumn was fairly well along and there were few active flies left around the laboratory.

But these two flies showed quite different modes of flight, though they were both of the same species. One of them struck down sharply and strongly with each beat of its wings, then brought the wings up more slowly, leading with the front edge, to begin another strong down-stroke. Most of the power was put into the downward beat.

The other fly got more of a "rowing" motion into its wing action. There was less lift in its strokes, but it gained ground on both forward and back swings of its wings. It will be interesting, when spring comes again and the two young scientists have more flies to work on, to learn whether these pestiferous but efficient insects know any other tricks of flight. Further studies on other insects, as well as on other flies, are scheduled.

A more agreeable flying subject was found in a pet canary. The little bird was held gently in the hand of one of the experimenters, while the other prepared and focussed the camera. Then the hand was opened, and the canary dropped into the air. The film shows wings swinging in a sort of figure-8 pattern as they gain a grip on the air and lift the bird out of its initial short drop. Interesting, too, is the action of the legs; as the canary drops into the air they go through alternate sweeping kicks, as though seeking a solid support that is no longer there. It has often been noticed that small birds fly with their feet well tucked up, but just how soon that happens the present film does not show, for the canary is still kicking as it flies out of the picture.

### Snake's Tongue Pictured

Another quick-action film is that of the forked tongue of a snake, as it flickers in front of its scaly jaws. Snakes' tongues seem to move incredibly fast, to most of us; but the Edgerton-Germeshausen camera shatters that illusion. This is one of the slowest of the films, taken at a speed of only 250 exposures a second, yet it shows all details of structure and motion quite clearly.

This new tool of science was not originally designed for use in the solution of biological problems at all. Dr. Edgerton and Mr. Germeshausen wanted something that would "freeze" the motion of rapidly-turning electric generators and other machinery, and they worked it out with only its potential usefulness as an engineering research instrument in mind.

But once they had it fairly well de-

veloped, they could not resist trying a few stunts: bubbles bursting as bullets sped through them, golf balls wafted into the air under the impact of a driver, electric light globes flaking into fragments under a hammer, the slow splash of a dropped glass of milk or a cup of coffee, etc. Many of these earlier pictures have already become quite familiar to the public.

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*Science News Letter, February 10, 1934*

### ARCHAEOLOGY

## Mound Builder Home Discovered in Louisiana

**A** LONG-STANDING mystery of prehistoric architecture in this country has been cleared up. The home of a Hopewell Mound Builder has been discovered, and science now knows what sort of houses were the "better homes" of the Midwest. James A. Ford, who is excavating at Marksville, Louisiana, under auspices of the Smithsonian Institution, has reported the discovery.

The post holes of the house are so clearly marked, Mr. Ford said, that the ground plan can be reconstructed. It appears to have been a one-room rectangular house about fifteen feet long and seven feet wide. It was partly underground, for a clearly marked pit was found in the center.

Archaeologists pronounce the house plan very similar to that of the Basket Maker Indians who lived in the Southwest in the centuries around the dawn of the Christian era. Homes roughly similar to this were rather widely diffused in the United States.

The Hopewell Mound Builders represented a high peak of cultural advancement in the prehistoric Midwest. Archaeologists first discovered them by exploring earthen mounds in Ohio, in which the dead were buried. These revealed that Hopewell Indians conducted trade over thousands of miles of wilderness, entirely on foot, in order to acquire copper, bears' teeth, volcanic glass, and other valued goods. The chieftains wore hammered copper breastplates and helmets and strings of river pearls and garments of woven cloth dyed in interesting patterns.

Recent discoveries in Louisiana have shown that a southern variation of the Hopewell culture existed contemporaneously with it and was closely allied.

*Science News Letter, February 10, 1934*



## GEOLOGY

# 100,000-Year-Old Carcasses Explain Black Sea Poisoning

**C**ARCASSES of beasts that died a hundred thousand years ago or more still choke the bottom of a large part of the Black Sea, and still poison the water there with the noisome products of their decay.

This explanation of the Black Sea's 200,000 square miles of "poison water" was offered by Prof. Reginald A. Daly of Harvard University, who delivered the Silliman lectures at Yale University.

During the last great Ice Age, Prof. Daly explained, so much water was locked up in the great glacial sheets that the sea level was materially reduced. The Black Sea was thus filled with fresh water, and the overflow river of this enormous lake cut the valleys now represented by the Bosphorus and Dardanelles straits. When the general sea level rose again, the salt Mediterranean water entered the fresh water basin and killed its fresh-water animals. The decay of their carcasses poisoned the Black Sea water, from the bottom at the depth of 110 fathoms or 200 meters up to the 90 fathom or 150 meter level, Prof. Daly stated.

"Through that great thickness, a half million square kilometers of water remain poisoned to this day."

"The Glacial lowering of general sea level laid bare wide belts of the continental shelves, now bounded by the 40 fathom line," Dr. Daly said. "Those strips of new land were several hun-

dreds of thousands of miles in total length and up to 100 or more miles in width. Across the temporary lands the rivers were extended and there cut channels in the shelf sediments.

"An illustration is that of the North Sea area, where the floor of that shallow sea emerged. The Dogger Bank became dry, and it remained dry long enough to win covering peat bogs, fragments of which have been dredged up by fishermen from depths of 40 meters. Elsewhere on this new land forests grew. Fishes now swim over the tree trunks, drowned by the last upswing of ocean level. Recently tusks of mammoths have been dredged up from the bottom of the North Sea. Across the temporary land, the Rhine

River was lengthened by about 200 miles, and it gained the drainage of the Thames River.

"Another important result of the lowering of the sea level was the conversion of wide but relatively shallow straits into dry land, with the formation of land bridges between continent and continent, and between continent and island. Thus, for many thousands of years land animals could walk, migrate between Borneo and Sumatra; between Tasmania and Australia; between Ceylon and India; between Asia and America, at Bering Strait; and between many a West Indian island and its neighbor."

*Science News Letter, February 10, 1934*

According to tests made on a level road in Iowa, an automobile must exert 36 horsepower to travel 45 miles an hour against the wind, whereas traveling with the wind only 15 horsepower was needed, and when no wind was blowing it took 24 horsepower to maintain the same speed.

## GENERAL SCIENCE

# Research Can Point Way To Better, Less Costly Navy

**T**HREE HUNDRED and eighty million dollars.

That is what the government of the United States is going to spend, to bring the Navy up to the limits permitted by the treaties of Washington and London. This huge expansion of our armament afloat, advocates of the Navy bill tell us, is not intended as an aggressive gesture. Great Britain, they point out, has already built to near the maximum which we are privileged to equal if we desire; Japan has already built the last fighting ton of her quota, and her statesmen are impatiently demanding full tonnage parity so that they may build more. The new five-year naval plan is intended only to help us attain, belatedly, our own full and acknowledged rights.

Acceding to this thesis for the sake of saving argument, is it still necessary to look forward to such a terrific drain on the treasury? Can not some way be found to make our navy equal to the best in the world, able to meet any demand unexpected war may impose upon

it, and still save some part of that \$380,000,000 for use in less controverted and more immediately beneficial public works, such as schools and hospitals, better homes for the poor, roads, river improvements and farm experiment stations? Can't we manage a better bargain in warships somehow?

We can, and by the same method we manage better bargains in buying for the works of peace. We can do it by spending a fraction of a per cent. of that money for scientific research, applied directly on problems connected with the construction and operation of those same ships of war.

Battleships, cruisers, submarines, fighting planes, are all highly complex jobs in engineering, in applied physics and chemistry. Money can be saved on every one of them, from the day its keel is laid until it is outmoded and cut up into junk with oxyacetylene torches, by continuous and progressive research on better steels and other construction metals, on electrical equipment, on steam engineering and propulsion machinery, on explosives and projectiles,

▼ **THE ROMANCE OF THE ELEMENTS**

**R** an address by

**A** Dr. H. I. Schlesinger

**D** Professor of Chemistry, University of Chicago

**I** Wednesday, February 14, at 4:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

▲

# Can You "NAME IT"



**Here** is an intellectual game your friends will enjoy. Any number can play "Name It"—as many as ten or more, as few as two. People who like to use their heads will find it interesting and stimulating.

"Name It" requires a set of ten striking science pictures. The object is to write the most accurate, most amusing, most curiosity-arousing, or most clever title.

## How to Play

Let us say you have six guests. Select six pictures from your set, and give one of the pictures, face down, to each guest. Then pass paper and pencils. Announce that you will allow one minute for each person to write the number of his picture and a good title that will show that he (or she) knows what the picture is. Or make the purpose: (1) Most amusing title; or (2) Most curiosity-arousing title; or (3) Most clever title.

Keep time with a watch having a second hand. Allow no one to work overtime. Quick judgments will result in more fun-provoking answers.

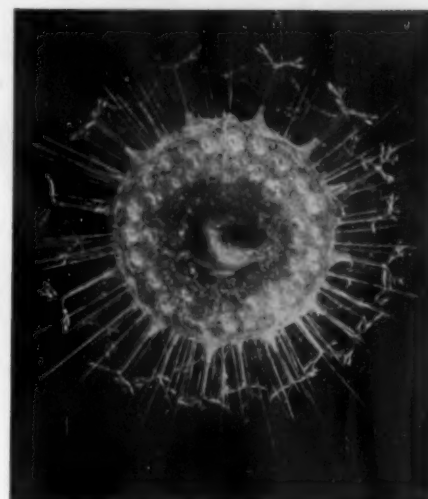
Keep the six pictures rotating until each person has guessed at all of them. Then have each one read aloud his titles. The one with the greatest number of *best* titles wins.

## How to Get the Pictures

Fill in and mail, with 30 cents in stamps or coins, the coupon below, and we will send you two copies of SCIENCEPICTURES, the new book

containing forty-five photographic reproductions, each the size of SCIENCE NEWS LETTER's front cover picture.

There is an unusual title under each picture. Opposite each there is a clear, brief description of the subject matter of the picture, for your use in judging titles.



## How to Make the Game

Clip from one book the pictures you want to use and paste them on cards for your game. Keep the other book for reference. We suggest that you use the following titles from the book, as a starter:

"Like a Jewel from Fairyland"  
"Spiny Sculpin Uses Chinese Camouflage"  
"Not a Fairy's Furry Opera Cloak"  
"New Atom Smashing Machine"  
"Young Gargoyle Out for a Walk"  
"Wind Blown Lightning"  
"55 Ton 'Top' to make Ship Ride Smoothly"  
"Myriads of Sisters, but No Twin"  
"She-Wolf Guards Her Young"  
"In the Form of a Dove"

When you have pasted these pictures on stiff paper or cardboard, number the cards in order, from one to ten. Now you are ready to start playing this new game for people interested in science and in scientific oddities—this game for people who like to use their heads.

— — — — **This coupon is worth 20c** — — — —

SCIENCEPICTURES sells for 25 cents a copy. You will need two, one as a reference and the other to cut up for the new game. We don't want to charge you full price for the second, so we will send you both for 30 cents.

*Send for the two copies of SCIENCEPICTURES, and start playing "Name It," the new game for people who like to use their heads!*

To SCIENCE NEWS LETTER

21st and Constitution Avenue, N.W., Washington, D. C.

For the enclosed 30 cents please send me two 25-cent copies of the new book, SCIENCEPICTURES.

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on navigation, gunnery and torpedo methods, on psychological tests and medical protection looking toward the better training, health and morale of the personnel. Research makes navies better and more economical at the same time.

The point has been proved dramatically by the post-war German navy. Trimmed down to vest-pocket dimensions by the terms of the Treaty of Versailles, the new German ships have taken advantage of every ounce allowed them by intensive use of the products of research: lighter but stronger steels, welding instead of riveting, improvements in armament—until the French have felt themselves compelled to "answer" the 10,000-ton ships of the "Deutschland" class with "Dunquerque" two-and-a-half times as big.

Yet while we in the United States prepare to spend the ransom of a hundred kings on naval expansion, we have in the name of "economy" disrupted the very research programs and institutions that could be saving us a part of that money. The National Bureau of Standards, the Naval Research Laboratory, the national, state, university and private research institutions and laboratories have had their budgets cut to the bone (or deeper), have postponed the installation of needed new equipment, have dismissed younger scientists and demoralized older ones with salary cuts below decent family living standards. We as citizens owe it to the National Defense as well as to National Recovery to demand of our Congressmen that they spend at least a per cent. or two of this enormous sum for naval increase in getting us better value for our money through properly directed efforts of science.

Science News Letter, February 10, 1934

#### PUBLIC HEALTH

### Defective Plumbing Menaces Health in Cities

**S**TRIKING evidence of the health hazard of defective plumbing may be seen in the discovery that this was the source of the Chicago outbreak of amebic dysentery in the summer and fall, from which nearly 800 cases and many deaths have been reported.

A committee which studied the outbreak, found three important groups of structural sanitary hazards in both Chicago hotels from which came most of the cases. These were:

"1. Old and generally defective water and sewerage piping layouts, potentially at least permitting back siphonage of a number of fixtures, such as bath tubs and flush toilets, into water lines.

"2. Chance breaks in sanitary sewers or heavy overflows of mixed sanitary sewage and storm water drainage in and outside of the basements.

"3. Cross-connections of serious character between water and sewer lines or between water lines carrying potable water and water potentially subject to contamination."

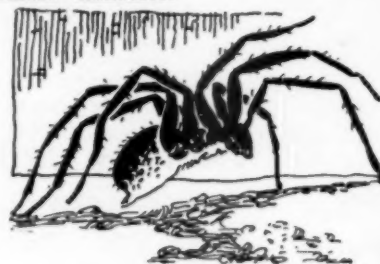
The editor of *The Journal of the American Medical Association* points out that "the laws of practically every state and city forbid the existence of cross-connections in plumbing which permit sewage or contaminated water supplies to mix with supplies of water for domestic uses."

Nevertheless it is apparent that such cross-connections do exist in many of these hotels and buildings and are a "constant menace to the health of human beings."

Science News Letter, February 10, 1934



BIOLOGY—TECHNOLOGY



#### A Lesson From Arachne

**I**SN'T IT ODD, how men learned from such humble creatures as spiders and caterpillars how to make the lovely rayons and similar synthetic fabrics that fill our shops today!

Many years ago entomologists, with no more practical motive than to find out how these thread-spinning small animals carried on their craft, painstakingly dissected their silk glands. They worked with amazingly slender tools, and carried on their operations under microscopes. They were rewarded by the simple satisfaction of their curiosity, and being only simple scientists were contented with that.

They found that the threads spun by spiders, caterpillars and other lowly, many-legged creatures were not formed within their bodies and unreeled as off a spool or out of a coil. Within the body there was simply a gland that secreted a thick, sticky liquid like glue. When this was squeezed out through a group of little pores, the "spinnerets," it hardened instantly and became a tough thread of almost miraculous strength. Weight for weight, a spider-web is commonly asserted to be much stronger than steel wire.

But the secret discovered by the inquisitive scientists was not destined to be let alone, nor to remain without its practical application. Two of the most outstanding of man's qualities are his imitativeness and his insatiable appetite for putting everything he sees or learns to use for his own personal satisfactions—both of which qualities he shares with his humbler and less successful cousins, the apes. So that as soon as men knew how the silkworm spun its thread there were other men who asked, why not do this ourselves?

They were a long time about it, and

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they made many false starts and experiments that ended in failure, but finally they did succeed in making fairly good "iron silkworms," and these are today pushing the natural silkworms hard for their share of the glossy-fabric business. For rayon threads and all their silky synthetic kin are made by first digesting vegetable material (cellulose) with acid into a gluey mass more or less like the stuff secreted by a spider's or a caterpillar's silk gland, and then squirting it out through microscopic holes and letting it harden into fine fibers which are then twisted into thread or yarn.

The old classic legend has it that the goddess Athene, being challenged to a contest in weaving by a mere mortal woman named Arachne, turned her presumptuous rival into a spider. Athene was credited by the Greeks with having taught the daughters of men how to spin and weave. But it would seem that after long ages Arachne has had her revenge: she has taught mankind a secret that not even Athene knew.

*Science News Letter, February 10, 1934*

## STANDARDS

## Bureau of Standards Urges Use of Informing Labels

IN ACCEPTING commercial standards projects the U. S. Bureau of Standards will give priority to those in which producers are willing to label their products guaranteeing compliance with standards. This move, just announced by Director Lyman J. Briggs, is taken to give maximum service to the consumer in over-the-counter trade.

In a letter addressed to those interested in simplified practice and commercial standards, the Director announced that it has been decided to continue this type of work at the Bureau of Standards, in cooperation with the American Standards Association and other organizations and groups.

Some months ago, it was announced by the Secretary of Commerce that certain of these activities would be transferred to the American Standards Association, but this plan is now modified.

"The work has an added importance at this time because of the need for reference to standards of dimensions and quality in the NRA codes for fair competition," Dr. Briggs said.

*Science News Letter, February 10, 1934*

There are 225 languages spoken in India.

## •First Glances at New Books

Additional Reviews  
On Page 96

## Zoology

**HANDBOOK OF FROGS AND TOADS**—Anna Allen Wright and Albert Hazen Wright—*Comstock Pub. Co.*, xi+231 p., \$2.50. This is a book for which thousands of biology teachers in high schools and colleges all over the country have been waiting. It gets together into one place all present available taxonomic and biological information about the Salientia, keys them out, describes them fully, and backs up description with beautifully definite photographic illustrations. The specified range is the whole of the United States and Canada, but excursions are made into the tropics with descriptions of such interesting species as the giant *Bufo marinus*. The book is announced as volume 1 of a new series: Handbooks of American Natural History. If succeeding volumes hold up to the standard set here, they will be valuable indeed.

*Science News Letter, February 10, 1934*

## Nature Study

**NATURE CHATS: A YEAR OUT-OF-DOORS**—John Harvey Furbay—*Science Press*, xv+255 p., \$1.75. This book is just what its title implies: chatty, discursive essays on all manner of out-of-door things, arranged season by season and week by week. It is well adapted for school use with more mature students, or it can be used to advantage and with pleasure by the solitary reader. Useful supplements tell how to collect and preserve biological specimens, suggest study projects, etc.

*Science News Letter, February 10, 1934*

## Medicine

**THE PREGNANT WOMAN**—Porter Brown—*Eugenics Pub. Co.*, 174 p., \$2. The author of this book, a physician, discusses the subject clearly, simply and thoroughly. Physiology and anatomy, diagnosis and general care during pregnancy and childbirth, sex education and the foolishness of old superstitions regarding pregnancy are all included.

*Science News Letter, February 10, 1934*

## Biochemistry

**THE LYOPHILIC COLLOIDS (THEIR THEORY AND PRACTICE)**—Martin H. Fischer and Marian O. Hooker—*Charles C. Thomas*, 246 p., \$4.50. This is a technical discussion of the authors' theory, their fifteen-year research on the subject, and some applications to problems of applied chemistry and of biology and medicine.

*Science News Letter, February 10, 1934*

## Geography

**POLAND PAST AND PRESENT**—Stefan Karski—*Putnam*, 160 p., \$2. An informative book, telling in plain fashion facts about a country perhaps less widely known than most European lands. Among the topics covered are the history of Poland, its government, finances, literature, arts and sciences, agrarian reform, social legislation, religion, and education.

*Science News Letter, February 10, 1934*

## Archaeology—Ethnology

**THE HISTORIC TRAIL OF THE AMERICAN INDIANS**—Thomas P. Christensen—*Laurance Press Co.*, Cedar Rapids, Ia., 193 p., cloth \$2, paper 65c. A very successful effort to pack into small space essential facts about the Indian. The author stresses the historic angle and carries his survey forward from conditions as they were in pre-Columbian times to the conflicts with white men, and finally to the Indian of today. Both North and South American Indians are included, and a wide range of information is covered.

*Science News Letter, February 10, 1934*

## Physics—Chemistry

**MOLECULAR HYDROGEN AND ITS SPECTRUM**—Owen Willans Richardson—*Yale*, 342 p., \$3. The hydrogen molecule  $H_2$  is the simplest of all molecules and it was one of the first structures found to be inexplicable on the old quantum mechanics. The author, whose name occupies a firm position in the development of modern physics, and who is Yarrow Research Professor of the Royal Society and upon the faculty of King's College, London, treats the spectrum of the hydrogen molecule exhaustively in this compilation of the Silliman lectures delivered at Yale. Incidentally, the hydrogen molecule should not be confused with double weight hydrogen (heavy hydrogen or deuterium).

*Science News Letter, February 10, 1934*

## Psychology

**CHILDREN'S FEARS, DREAMS, WISHES, DAYDREAMS, LIKES, DISLIKES, PLEASANT AND UNPLEASANT MEMORIES**—Arthur T. Jersild, Frances V. Markey, and Catherine L. Jersild—*Teachers College, Columbia Univ.*, 172 p., \$1.75. A study of 400 children aged 5 to 12 conducted by means of intimate personal conservation with each child alone rare view of the child mind.

*Science News Letter, February 10, 1934*

# ● First Glances at New Books

Additional Reviews  
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## Medicine

**THE SPAN OF LIFE AS INFLUENCED BY THE HEART, THE KIDNEYS AND THE BLOOD VESSELS**—Franklin R. Nuzum—*Charles C. Thomas*, 108 p., \$2. Since further increase in the span of life must come largely through conquest of so-called degenerative diseases—diseases of heart, kidneys and blood vessels—the board of directors of the Santa Barbara Cottage Hospital sponsored a series of informal popular talks on present knowledge of these organs and the diseases affecting them as part of a program of community health education. The talks form the basis of this volume which should prove helpful to a wide group of readers.

*Science News Letter, February 10, 1934*

## Physics

**PHYSICAL OPTICS**—Robert W. Wood—*Macmillan*, 846 p., \$7.50. This third edition of a classic of modern physics, the last edition of which appeared in 1911, will be enthusiastically received. Dr. Wood explains that the theory of optical phenomena has developed since the last revision to such an extent that nearly one-half of the old edition had become obsolete. There are many new illustrations and among the completely new chapters are those on the origin of spectra and the Raman effect.

*Science News Letter, February 10, 1934*

## Vocations

**MAKE YOUR OWN JOB, OPPORTUNITIES IN UNUSUAL VOCATIONS**—Violet Ryder and H. B. Doust—*Wilson*, 217 p., \$2. Suggestions for the many who have no employment. In case you do not feel qualified to make baby mittens, you may be interested in photographing children, conducting a neighborhood nursery, or raising tropical fish. Written in narrative form.

*Science News Letter, February 10, 1934*

## Education

**A BACKGROUND STUDY OF NEGRO COLLEGE STUDENTS**—Ambrose Caliver—*Govt. Print. Off.*, 132 p., 10c. A study conducted by the U. S. Office of Education. It was found that, "The typical Negro college freshman is 20 years of age, has a mean psychological score of 76 (American Council on Education Examinations) and comes from a family of 5 children of which 1 has already graduated from college. His father and mother have respectively, 8 and 9 years

of schooling. During his high-school career he read 21 books voluntarily; engaged in 3 hobbies or interests; belonged to 3 organizations and held 2 offices. He comes from a home having a monthly income of \$95. The home he comes from contains 5 or 6 rooms and is occupied by 4 or 5 persons. His parents have 96 books in their home and take two magazines."

*Science News Letter, February 10, 1934*

## Medicine

**BEHIND THE SCREEN**—Maurice Chideckel—*American Medical Pub. Co.*, 275 p., \$2. Written in the form of a "diary of a busy practitioner," this book purports to show human nature as seen behind the screens of hospital wards and consulting room doors. The book shows a striking lack of sympathy for and tolerance of human vagaries, qualities which are characteristic of most physicians and were so markedly exhibited by Sir William Osler, Weir Mitchell and Oliver Wendell Holmes, the three physician-authors mentioned in the preface by Laurance D. Redway.

*Science News Letter, February 10, 1934*

## War-Medicine

**MEMORIES OF KUPEIKOW**—Joseph Yu—*Liang You Pub. Co., Shanghai*, 92 p., \$1 unbound, \$2 bound. This volume of pictures with titles in Chinese and English is a vivid reminder that there have been major wars since what has been called "The Last War." Dr. Yu was captain of a unit of the Chinese Red Cross in the Sino-Japanese conflict early in 1933. He has brought together photographs taken during his service.

*Science News Letter, February 10, 1934*

## Ethnology

**THE EGYPTIANS**—S. R. K. Glanville—*Macmillan*, \$1. This small book has the pleasant task of introducing the ancient Egyptians to young readers in their teens. From his work in the Department of Egyptian Antiquities in the British Museum, Mr. Glanville is very much at home with the Egyptians, and he describes the life of kings and peasants and government clerks in lively fashion.

*Science News Letter, February 10, 1934*

## Zoology

**WHITE-TAILED DEER OF THE ADIRONDACKS**—M. T. Townsend, M. W. Smith and Chas. J. Spiker—*Roosevelt Wild Life Forest Experiment Station*, 235 p., 5 folded maps, \$1. Beauty and interest for the present-day nature lover and the zoologist, game for the modern hunter, the white-tailed deer lays claim to our consideration also because of his highly important past; for he was food, clothing and tools to the red man and the first comers of the white. What he is doing now, under changed conditions, is still of interest and importance especially in view of the new program for the retirement and reforesting of sub-marginal lands. For all these reasons, and others besides, the present study will be valuable.

*Science News Letter, February 10, 1934*

## Entomology

**AN ECONOMIC ENTOMOLOGY OF THE WEST INDIES**—George N. Wolcott—*Entomol. Soc. of Puerto Rico*, xviii+688 p., \$3. Among the first tropical lands to be subjected to agricultural development by modern Europeans, the islands of the West Indies are still among the most important. The myriads of insects that levy unprofitable toll on their produce are therefore of exceptional importance; so that in producing this first general text and reference book for island planters and educators Dr. Wolcott has performed a major service. The approach is by way of the host plant. Quite properly, first attention is given to insects attacking sugar cane, but due space is also devoted to the pests of fruits, especially pineapple and citrus, and of tobacco and other crops.

*Science News Letter, February 10, 1934*

## Nutrition

**DIET AND PERSONALITY**—L. Jean Bogert—*Macmillan*, 223 p., \$2. "Fitting food to type and environment" is the secondary title given by the author to this book which has an introduction by Prof. Lafayette B. Mendel. Practical advice for the fat, the thin, the nervous, the dyspeptic and the food faddists is given in a chatty, easy-to-read style.

*Science News Letter, February 10, 1934*

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